HP Compaq Thin Clients

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Executive summary 3

What is a thin client? 3
- Server-based computing model 3
- Consolidated Client Infrastructure (CCI) 4
- What's in a thin client? 4

Who needs thin clients? 5

HP Compaq thin clients 6
- What's special about these products 6
- HP Compaq t5125 Thin Client 7
- HP Compaq t5520 Thin Client 8
- HP Compaq t5525 Thin Client 8
- HP Compaq t5720 Thin Client 9
- Thin Client options 9
- Altiris Deployment Solution 11
- Feature comparison 12

Implementing a TCSC environment 13
- The Microsoft component 13
- The Linux component 14
- The Citrix component 14
- The HP component 15

The HP advantage 15
- Choosing a server 16
- Blade PC 17
- Choosing a monitor 18

HP Lifecycle Solutions 19
HP Care Pack Services 19
HP Access on Demand 20
HP quality and reliability 20
HP compatibility/industry standards 21
Conclusion 21
Appendix: Sample scenarios 22
Business application solution 22
Citrix portal solution 22
Wireless solution 23
For more information 24

Simple, dependable, manageable, and more secure solutions for your business environment

HP helps you gain a competitive edge by providing affordable and secure thin clients with Microsoft® Windows® and Linux operating systems for your server-based or blade PC computing solutions that simplify IT management. HP thin clients lead the way with proven business technology for maximum security and lower ownership costs through reliable and consistent products that are easy to buy, easy to deploy, and easy to manage for outstanding investment protection.

Executive summary

More and more organizations are recognizing the benefits of thin client server computing (TCSC)*. Thin clients deliver a desktop experience in work environments where end users have a well-defined set of tasks, such as general office applications in medical, financial, educational, government, manufacturing, distribution, or call center environments. Above all, they provide you with:

- Fast, convenient access to applications
- Rapid, centralized deployment of new applications
- Controlled, secure environment with no removable media, reducing the risk of viruses and product or data theft
- Simplified client architecture and reduced hardware maintenance costs
- Server utilization optimized by load-balancing features that automatically route user sessions to the server with the lightest load
- Improved, simplified manageability, reducing the workload for IT staff
- Enhanced security and backup
- Software from Microsoft and Citrix that delivers an ideal TCSC solution

This document helps you evaluate HP thin client offerings, including key benefits features. In addition, it offers an overview of TCSC and TCSC components and provides sample scenarios showing how thin clients can meet various business needs.

What is a thin client?

A thin client is a computing device without a hard drive, which displays data and applications from remotely located servers or blade PCs. There are two major models of thin client computing, discussed on the following pages.

Server-based computing model

In the traditional server-based computing model, the thin client only runs the user interface and transmits the mouse clicks and keyboard data to a server. User applications run on the server, and the video data is sent back to the client for display. In this computing model, thin clients are typically utilized as part of a Citrix Presentation Server or Microsoft Terminal Services deployment. Many companies choose server-based computing to centralize application deployment and database information, or to deploy web portals. Thin clients can also be used to access the Internet through a browser, or to replace older devices commonly referred to as "green screen" terminals. Offering the look and feel of a regular Microsoft Windows PC, thin clients allow businesses to centralize computing power, storage, applications, and data on servers running in a data center.

* This is also known as server-based computing (SBC).

Consolidated Client Infrastructure (CCI)†

Thin clients are also an important component of a Consolidated Client Infrastructure (CCI) solution, an entirely new computing model being introduced by HP to many of its best customers (not available in all regions).

The Consolidated Client Infrastructure (CCI) solution centralizes desktop computing and storage resources into easily managed, highly secure data centers, while providing end users the convenience and familiarity of a traditional desktop environment. It provides a dynamic workplace solution that may dramatically lower desktop total cost of ownership (TCO) while raising levels of security, service quality, and ease of management. CCI is an example of HP virtualization solutions – solutions that enable an adaptive enterprise where business and IT are synchronized to capitalize on change.

Capitalizing on combined product and services offerings from HP, CCI is a three-tiered architecture that consists of:

- An access tier using thin clients;
- A compute tier with racks of blade PCs inside a data center;
- A resource tier made up of a storage pool, network printers, application servers, and other networked resources, also inside the data center.

With CCI, end users access their applications and data in a customized environment – just as they do today. The difference is that users work on a thin client and establish a one-to-one connection with dynamically allocated blade PCs and centralized storage. Individual desktop images and data are stored and controlled in an IT infrastructure in the data center.

What's in a thin client?

A basic thin client consists of a processor, flash memory for storing the embedded operating system, local RAM, a network adapter, and standard input/output for the display and other select peripherals. HP thin clients have no moving parts, offering higher reliability than a PC, lower ownership costs, enhanced security, and extended product life. These small, robust devices consume significantly less energy than a desktop PC, put out less heat into your office spaces, are made with much less material than a desktop, and are practically silent.

Thin clients are based on the Microsoft Windows Embedded family of operating systems, which includes Microsoft Windows CE 5.0 and Microsoft Windows XP Embedded, and the Linux operating system. These devices are key components in server-based computing solutions where applications are deployed through the Terminal Services functionality of the Microsoft Windows 2003 Server family, through Citrix Presentation Server, through Web-based services, or through blade PCs.

Thin clients and power applications

Thin clients are not recommended for some applications, such as those involving workers who need powerful local processing and significant storage. These workers typically include engineers, graphic artists, multimedia developers, and designers.

† Not available in all regions.

Who needs thin clients?

Thin clients can meet many business needs:

- Businesses where end users have a well-defined set of tasks, such as general office applications in medical, financial, educational, government, manufacturing, distribution, or call center environments. Users can run a wide range of office software such as Microsoft Word, Excel, and PowerPoint or unique applications required by your line of business.
- Businesses that require a highly available network of computers connected to a centralized server running mission-critical applications can greatly benefit from the reliability of thin clients. Hospitals, insurance agencies, airline reservation centers, and hotels are typical businesses that fall into this category.
- Businesses with departments that carry out highly standardized computing tasks, such as sales or service call centers, data entry departments, or technical support desks, may realize substantial cost savings by deploying thin clients rather than desktop PCs. The computing power and flexibility of a desktop PC is often unnecessary and potentially undesirable in this environment—users may load local applications, reconfigure, or otherwise tamper with the integrity of a desktop PC.
- Educational institutions and similar organizations typically need more computing resources on an ever-shrinking budget. Universities and schools with under-resourced IT departments must keep hundreds or thousands of computers up and running with the latest software, despite supporting multiple users per machine. Thin clients can meet these challenges in two ways: with their solid construction and lack of moving parts, thin clients are designed to withstand heavy usage; and, because applications and storage usually reside on the server, the latest versions are always available to every user.
- Businesses using dumb terminals can upgrade to thin clients to offer a more robust platform that can handle e-mail programs (such as Microsoft Outlook 2003) and common business applications (such as Microsoft Word or Excel). The HP Compaq t5000 Thin Client series offers optional expansion that includes hard drive, diskette drive, or CD-ROM capabilities with an external MultiBay. Terminal emulation gives thin clients access to legacy database information.

IT managers at *Fortune* 1000 businesses which have aggressive cost-cutting agendas are challenged to do more with less on a daily basis. Thin clients typically promote cost savings by reducing the amount of IT support staff needed—they allow network administrators to update software remotely rather than deploy it repeatedly at the desktop. In addition, new thin clients are easy to deploy—often in less than 15 minutes.

HP Compaq thin clients

This section provides an overview of thin client solutions offered by HP and compares the key features of each. This section also outlines management software supplied with these thin clients.

What's special about these products

- Industry-standard components. Users get PC-like performance thanks to industry-standard architecture, discrete BIOS, and a complete Microsoft Windows or Linux embedded operating system. The hardware, BIOS, and image layers used on these models are standard PC technology, already tested on millions of PC users. This means that HP thin client customers can reap the benefits of already proven technology while leveraging existing IT skill sets.
- Improved efficiency and reliability. Solid-state design with no moving parts offers higher reliability than traditional PCs, resulting in fewer maintenance events and less down time. No moving parts means no audible noise and longer life expectancy. HP thin clients are power-efficient for direct electrical costs savings--using less wattage than a PC.
- Lower total cost of ownership (TCO). Improved reliability and industry-standard components help HP thin clients lower your total ownership costs. No moving parts means fewer maintenance events and less down time than traditional PCs. Thin clients also reduce the chances of data loss or theft, because all data and applications are stored remotely. Help desk support calls are reduced since the client image is simple and controlled, and the applications are hosted on servers that the IT administrator can carefully control and manage for enhanced reliability.
- Enhanced security
    - Data security. No removable media drives or hard drives help prevent data theft or loss, and critical information is stored on network storage, ensuring reliable backup and redundancy. Additionally, when the client logs into a Citrix server or Microsoft Terminal Server for a client session, the data can be encrypted to ensure your session is secure.
    - Virus and worm protection. Every HP Compaq t5720 XPe thin client ships with HP Sygate Security Agent preinstalled and Microsoft Windows Embedded SP2. This provides a multilayered security approach that includes an application-centric firewall, application control, intrusion prevention, and policy enforcement. Sygate locks down the network communication of the thin client to only the required applications and network traffic, ensuring that no malicious application can send data to or from the embedded device. All data entering or exiting the unit is analyzed against signatures of known attacks and behavioral patterns of unknown attacks, effectively protecting the embedded device. The HP/Sygate solution provides a more secure product and a comprehensive solution to ensure that mission-critical applications and networks are not compromised.
- Rapid client deployment. HP thin clients run "out of the box" with a familiar desktop environment, taking just minutes to set up. Establishing your client network is also easy with automated HP setup and configuration tools and Altiris Deployment Solutions. HP uses industry-standard technologies that keep you from getting locked into a proprietary tool set.
- Rapid application deployment. Since application software is hosted remotely, it's easy to upgrade users quickly and inexpensively to the latest applications by updating the server or blade disk image. Users can be set up and ready to start working within minutes. Software upgrades and changes are also done centrally, not on individual client PCs, so ongoing maintenance

and support may be dramatically reduced when compared to standard PC deployment.

- Quick problem resolution. Problem diagnosis can be much simpler on a thin client terminal than on a standard PC, where the variables are greater.
- Better system protection. Since thin clients have no removable media disk drives, users are less likely to introduce new software into the system, which means fewer hardware and software conflicts, fewer configuration issues, and reduced threat of viruses. Thin clients typically connect to application servers for operation, reducing the likelihood of product or data theft. For even more security, some customers may add options such as readers or biometrics to provide an additional, more sophisticated level of user authentication.
- Excellent performance. The innovative design of the HP Compaq t5000 Thin Client series includes the high performance processors available for thin clients today with leading price/performance in every class, including features such as an internal amplified speaker, 16 MB graphics memory, IDE flash memory, and an easy-to-remove stand that allows for vertical or horizontal positioning for integration into most environments. The cable-free internal design enhances ease of serviceability and increases reliability.
- More flexibility. Optional PCI expansion slots on the t5720 provide more option support. USB 2.0 support also allows for faster data transfer with peripherals.
- Global coverage. A limited global three-year hardware warranty is available in more than 100 countries.

Figure 1. HP Compaq t5000 Thin Client series

HP Compaq t5125 Thin Client

The HP Compaq t5125 Thin Client is our simplest solution—at our best price—with all the essentials of server-based computing for task-oriented workers using general office applications or your specific line of business software. This model offers support for ICA, Rdesktop RDP client, and X-Windows (via Remote X or XDM).

Key features include:

- 400-MHz VIA processor
- 32 MB Flash memory for drivers and applications, 128 MB DDR SDRAM for system memory*
- Four USB, serial, PS/2 and parallel ports, MultiBay, and support for Smartcard reader
- HP Connection Administrator, Citrix ICA client, Rdesktop RDP client for connecting to Microsoft RDP sessions, X-terminal, and VNC shadowing
- Configurable local users and user permissions

* 16MB reserved for video graphics usage

- Enhanced security with no local storage enabled, remote BIOS configurability, and a hardened user profile and partitioning to limit OS vulnerability
- Remotely managed BIOS for port lockdown
- Altiris Deployment Solution

HP Compaq t5520 Thin Client

The HP Compaq t5520 Thin Client offers enhanced features for mainstream business use with support for legacy ports and software support for ICA, RDP, terminal emulation, and basic web browsing.

Key features include:

- 800 MHz VIA processor
- Microsoft Windows CE .NET 5.0 operating system provides low cost, industry standard thin client operating system with Citrix ICA, Microsoft's latest RDP client, Internet Explorer 6.0 for CE, Windows Media Player 9.0, terminal emulations, and VNC shadowing
- 64 MB of flash memory and 128 MB of DDR system memory*
- Four USB ports for Plug and Play support
- Serial, PS/2 and parallel ports; MultiBay and security options
- Remotely managed BIOS for port lockdown
- Altiris Deployment Solution

HP Compaq t5525 Thin Client

The new competitively-priced Linux-based HP Compaq t5525 Thin Client provides freedom of choice and the security of a Linux client for server-based computing environments, with enhanced features that make it ideal for mainstream business use, including expanded options, legacy ports, and software support for ICA, RDP, X terminal, and web browsing.

A Board Support Package (BSP) for use with the Metrowerks Platform Creation Suite allows extensive image customizations to meet highly specific customer requirements. You can download it at www.metrowerks.com/MW/Develop/Embedded/Linux/hpthinclient.htm, along with an evaluation copy of the Metrowerks Platform Creation Suite.

Key features include:

- 800 MHz VIA processor
- Generous 256 MB Flash memory provides ample storage for drivers and applications
- 128 MB system memory*
- Configurable local users and user permissions
- Enhanced security with no local storage enabled, remote BIOS configurability, and a hardened user profile and partitioning to limit OS vulnerability
- Linux operating system with HP Connection Administrator, Citrix ICA client, Rdesktop RDP client, X terminal, SSH, VNC shadowing, Adobe Acrobat Reader, and Firefox browser with Java
- Four USB ports, plus serial, PS/2 and parallel ports, MultiBay, and support for Smartcard reader
- MultiBay
- Security options
- Altiris Deployment Solution

* 16MB reserved for video graphics usage

HP Compaq t5720 Thin Client

With desktop-like features at a compelling price, the HP Compaq t5720 Thin Client is ideal for customers requiring a more powerful and flexible thin client.

- Run multiple windows, browsers, and terminal emulation sessions, and switch between sessions faster
- Run applications faster
- Fast graphics performance and refresh rates
- Legacy support to accommodate a wide range of peripherals

Key features include:

- AMD Geode NX 1500 processor
- Microsoft Windows XP Embedded with Service Pack 2 operating system
- 512 MB standard flash for drivers and applications
- 256MB or 512 MB of DDR system memory
- SiS741GX Integrated / UMA graphics with 16 MB of shared graphics memory
- Six USB ports plus parallel, two PS/2, and serial and parallel connectors for storage, security, and connectivity options
- External storage options include disk-on-key, CD-ROM drive, diskette drive, and hard drive (sold separately)
- Optional PCI expansion module allows you to add graphic, modem, wireless, and other options (sold separately)
- Altiris Deployment Solution
- HP Sygate Security Agent

Thin Client options

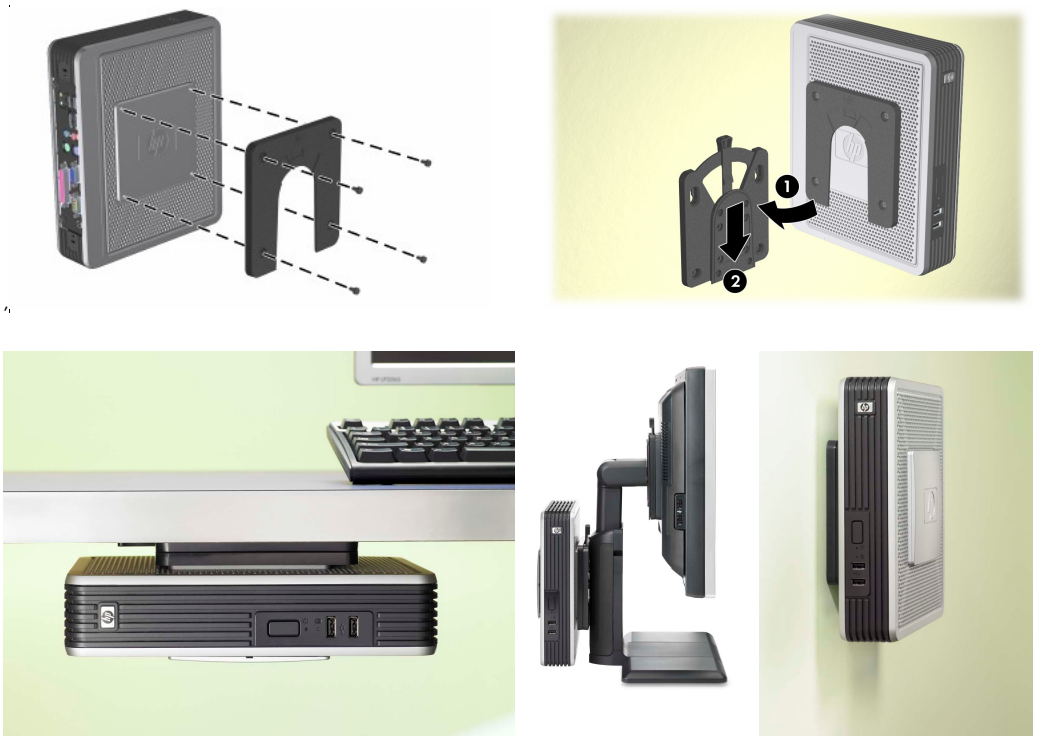
A wide variety of options (sold separately) are available for the HP Compaq t5720 Thin Client, to help provide customers with greater flexibility in expanding their work capabilities. Some HP options are plug and play ready with preloaded drivers to ease deployment, saving you time. Those options that are not plug and play have "add ons" defined for quick deployment.

Flexibility

The HP Quick Release is a unique and first-of-its-kind mounting solution that enables you to use the HP Compaq t5720 Thin Client alongside an array of VESA-compliant devices in a variety of multiple configurations.

The HP Quick Release is innovative and applicable across a broad range of current and future HP products, including LCD monitors, LCD TVs, projectors, and desktop products. The HP Quick Release ships standard with the new 20-inch HP LP2065 Flat Panel Monitor and is available for purchase as a standalone "option."

Figure 2. HP Compaq t5720 Thin Client connected to the HP Quick Release enables mounting on a wall, under a desk, or behind a monitor.



With the HP Quick Release, you can quickly and conveniently mount the HP Compaq t5720 Thin Client in a variety of settings, including:

- Under the desk
- On a wall
- Under a shelf
- Behind a display
- Behind a monitor stand
- Mounted with a monitor on a wall

The HP Quick Release allows you too create the "invisible client," mounted securely and safely out of view. For more information, please see the HP Quick Release QuickSpecs or Data Sheet document.

Storage

Local storage is available for HP Compaq thin clients through the use of such devices as disk-on-key and MultiBay options.

- Disk-on-key. The disk-on-key is a pen-sized USB removable storage device with 32 MB or greater of file storage capacity. Light weight and compact, it plugs into the USB port of a thin client or PC and acts like any other mass storage device. The host computer immediately detects the disk-on-key, recognizing it as a supplementary removable drive and assigns it a drive letter. Files located on the system can be moved to the device for storage or for transfer to another computer, much as would be done with a diskette drive. The benefits of the disk-on-key include the additional capacity that it offers over a standard 1.44-MB diskette drive, and the flexibility of transporting data on a small storage device versus a bulky removable drive or various diskettes.

- MultiBay. The Compaq External MultiBay supports a 1.44-MB diskette drive, 80-GB hard drive, or CD-ROM drive options.

Security

For additional personalized security, a security lock, and Smartcard Keyboard reader are available to prevent theft or unauthorized access to the thin client hardware.

HP Compaq t5720 models equipped with preinstalled HP Sygate Secrity Agent.

PCI Expansion Module

An optional PCI Expansion Module is available for the HP Compaq t5720 Thin Client. Some examples of optional PCI devices include wireless networking cards (802.11b/g), dial up modems, additional graphics, network, and input/output options.

Altiris Deployment Solution

Altiris Deployment Solution offers a single, comprehensive management solution for your HP thin clients, desktops, and notebooks. Reduce the number of management programs your IT staff must maintain and learn, and simplify management of computing resources.

From a central console, an administrator can use Altiris Deployment Solution to plan, deploy, and manage HP Compaq t5000 Thin Clients—from routine, daily tasks to the occasional large job such as disaster recovery or a large-scale software update. Capabilities include the following:

- Centralized management. Altiris Deployment Solution allows administrators to deploy and manage all thin clients from a centralized console.
- Mass deployments. Administrators can easily handle large-scale thin client deployments, installing software, assigning unique security IDs, and configuring user names, IP addresses, and other network settings from a remote console.
- Upgrades. After the thin clients have been deployed, Altiris Deployment Solution can manage day-to-day upgrades and redeployments—distributing applications, installing service packs, and more.
- Migrations. When a thin client is retired, the administrator can easily capture desktop, network, and application settings, and migrate them to the replacement device.
- Help desk responses. Altiris Deployment Solution allows the administrator to browse, diagnose, and in some cases, repair thin client issues from a central console. Detailed hardware and software inventories, along with remote control and chat features, help simplify remote diagnosis. Histories of tasks assigned to each thin client make it easy to restore a device to a previous working state.
- Disaster recovery. To ease disaster recovery efforts, Altiris Deployment Solution can automatically back up or restore configurations, settings, registries, and more.

Feature comparison

Table 1. Feature comparison of HP Compaq t5000 Thin Client family

Model	t5125 Thin Client	t5520 Thin Client	t5525 Thin Client	t5720 Thin Client
Processor	VIA Eden 400 MHz	VIA Eden 800 MHz	VIA Eden 800 MHz	AMD Geode NX 1500 processor
Operating system	Linux 2.4	Microsoft Windows CE 5.0	Linux 2.4	Microsoft Windows XPe, Service Pack 2
Standard memory	32 MB Flash/128-MB DDR SDRAM[1]	64 MB Flash/128-MB DDR SDRAM[1]	256 MB Flash/128-MB DDR SDRAM[1]	512 MB Flash/256 or 512 MB DDR SDRAM
Video	16 MB UMA graphics memory			SiS741GX Integrated / UMA graphics with 16 MB of shared graphics memory
I/O peripheral support	Enhanced PS/2 with Windows keys (104 keys) included, scroll PS/2 mouse included, VGA-type video output (DB-15), local and/or network printer support			
Ports and jacks	4 USB 2.0, 1 serial, 1 parallel, 1 PS/2, 1 RJ-45			2 USB 2.0 front, 4 back, 1 serial, 1 parallel, 2 PS/2, 1 RJ-45
PCI Expansion Module	None	None	None	1 optional
Connectivity	10/100 Base T, remote dialup via optional modem (select models). Wireless support via optional PCI Expansion Module available on the t5720 (802.11a/g). Note: A standard WLAN infrastructure may be required for applicable wireless communication.			
Manageability and Deployment	Free Altiris Deployment Solution with every thin client: use the same management software tools to control your thin clients, PCs, notebooks, and handhelds.			
	n/a	DHCP support for automatic image, configuration settings, and add-on upgrades	n/a	DHCP support for configuration settings
Terminal Emulations	X-terminal	Teemtalk for Windows, multiple emulations and personalities	X-terminal	Teemtalk for Windows, multiple emulations and personalities
Server OS compatibility/ support	Microsoft® Windows® NT Server 4.0 family, Microsoft Windows 2003 Server family, Microsoft Windows 2000 Server family (except Data Center addition); and Citrix Presentation Server 3.0 for Windows 2000/2003 Servers/Linux/Unix®			
Regulatory Compliance	Ergonomics	German EK1-ITB; EN29241-3, approved		
	Safety	UL 60950-1, CSA 60950-1; TÜV-GS (EN60 950) approved		
	RF Interference	FCC Class B; CE Mark; EN55022B; VCCI		
Dimensions Without stand (h × w × d)	55 x 205 x 195 mm (2.2 x 8.2 x 7.8 in)			250.18 x 65.78 x 205.48 mm (9.85 x 2.59 x 8.09 in)*
Dimensions With stand (h × w × d)	271 x 110 x 237 mm (10.67 x 4.33 x 9.3 in)			271.09 x 110 x 237.1 mm (10.67 x 4.33 x 9.33 in)
Shipping weight	1.32 kg/2.0 lb	1.41 kg/3.10 lb	1.41 kg/3.10 lb	5 kg/11 lb**
Power	Worldwide auto-sensing 100-240 VAC, 50-60 Hz energy-saving automatic power-down, surge-tolerant power supply			
Temp. range	32° to 104° F (0° to 40° C) (operating)/–40° to 140° F (–40° to 60° C) (non-operating)			
Warranty	Three-year limited hardware warranty. Certain restrictions apply. Visit the HP Customer Support Center online for details.			

[1]16 MB of system RAM is reserved for video graphics usage on t5125, t5520, t5525, and t5720.
*Width is 87.4 mm/3.6 in with PCI Expansion Module
**7 kg/15.5 lb with PCI Expansion Module

Implementing a TCSC environment

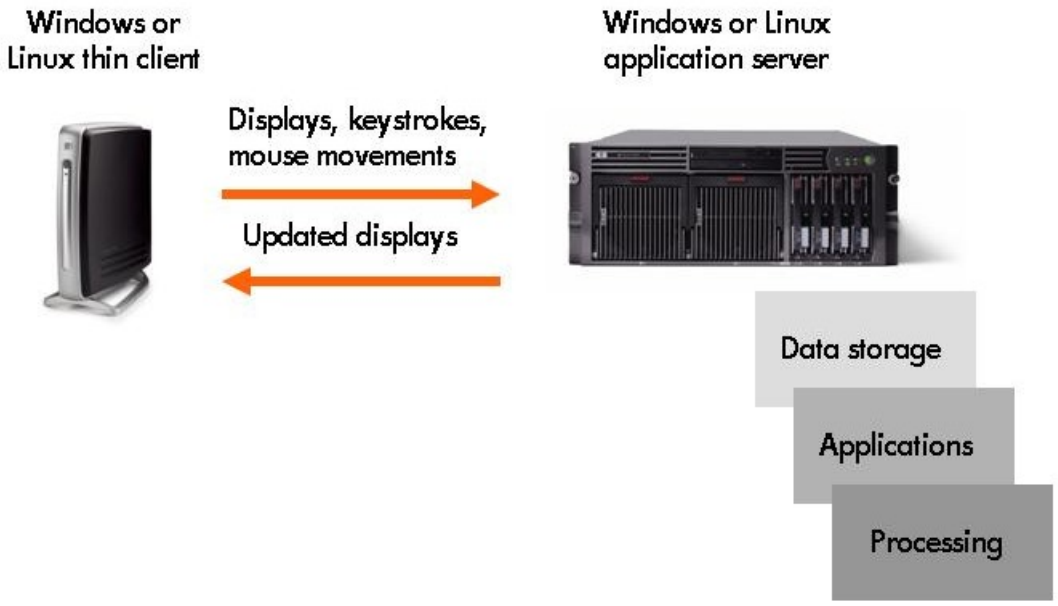
To help the customer maximize the benefits of a thin client environment, HP works closely with Microsoft, Debian, and Citrix, software leaders in the thin client marketplace. The following section describes components of a TCSC solution.

The Microsoft component

An HP Windows thin client, running Microsoft Windows CE 5.0 or Microsoft Windows XP Embedded on the client, supports the latest version of Citrix Presentation Server running in a Microsoft Windows server environment. In a TCSC environment, Terminal Services running on Microsoft Windows 2003 Server allow application execution, data processing, and data storage to occur on the server. Using terminal emulation software, the thin client sends only display refreshes, keystrokes, and mouse movements to the application server. The server carries out the specified actions on locally stored data and then returns an updated display to the thin client (as shown in Figure 2).

This approach promotes centralized application management, minimizing network bandwidth requirements between application servers and thin clients. With only displays, keystrokes, and mouse movements as network traffic, communications are minimal and inherently more secure.

Figure 3. Overview of communications between the thin client and the application server



The Linux component

An HP Linux thin client supports the latest version of Citrix Presentation Server running in a Linux server environment. Or, your client can use an X-terminal session to log onto a Linux or UNIX® server.

The Citrix component

Citrix Presentation Server is an industry-leading solution for centrally managing Microsoft Windows applications and delivering their functionality as a secure service to thin clients—throughout the business.

Citrix Presentation Server is designed to enhance the capabilities of Microsoft Windows 2003 Server, UNIX servers, and Linux servers. It provides the exceptional scalability, interoperability, manageability, flexibility, end-to-end security, and network leverage that businesses require from an application serving solution. Benefits include:

- Internet leverage. Data center managers can more easily deliver the functionality of any application to a thin client's Web browser without writing a single line of code. With Citrix Presentation Server's built-in secure gateway, Internet access is simple and secure, and end-to-end security is strong.
- Manageability and scalability. Citrix Presentation Server delivers the power to centrally configure and manage application servers using robust system management capabilities that can be integrated with third-party network management solutions (such as HP OpenView).

Adaptive infrastructure and sizing

An adaptive enterprise infrastructure is only as good as its ability to effectively run leading operating systems and applications. HP rigorously tests, optimizes, and certifies HP ProLiant servers to run applications from the leading independent software vendors.

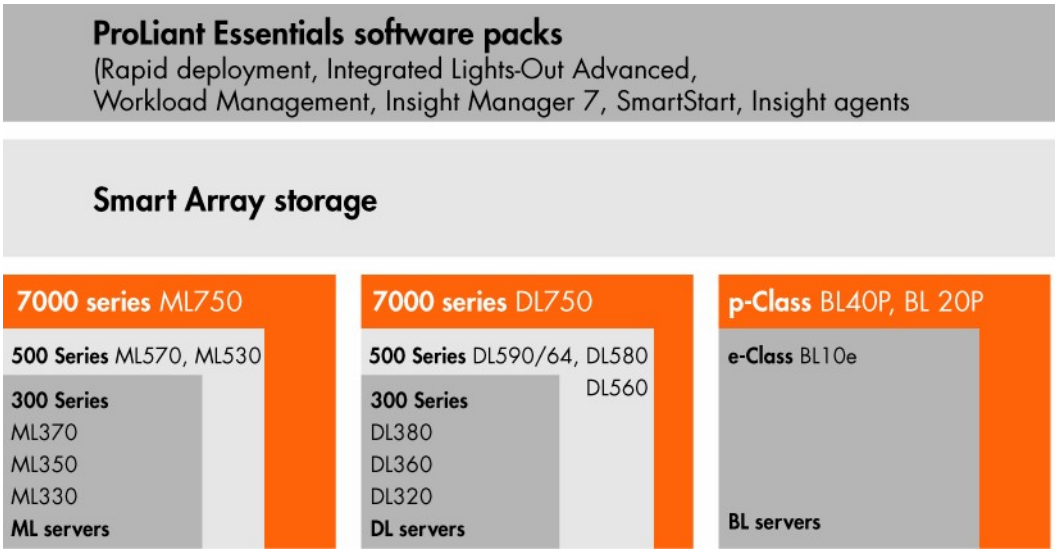
From planning and design to implementation and management, professionals from HP Services can help customers achieve their business objectives quickly and cost-effectively.

The HP component

When applications are centralized, rather than dispersed between individual thin clients, selecting a suitable server becomes even more critical. HP can deliver flexible, industry-standard server solutions to meet all customer needs—from a simple workgroup to a company-wide deployment. Whether deployed individually or clustered in server farms, HP servers can handle the most demanding tasks.

HP understands that businesses must adapt to survive, do more with less, and respond faster with fewer resources. With the HP ProLiant Advantage, now you can. The HP ProLiant Advantage combines solution integration and service expertise with an adaptive infrastructure (shown in Figure 3) consisting of versatile, industry-standard HP ProLiant servers, integrated HP Smart Array storage, and HP ProLiant Essentials software.

Figure 4. The three layers of adaptive infrastructure



Delivering the power, speed, manageability, scalability, and high availability required for thousands of users to access business-critical applications, HP ProLiant servers are ideal for the demanding thin client environment. In addition, these servers are optimized for use with Microsoft Windows 2000 Server and Citrix Presentation Server software.

The HP advantage

When you buy from HP, you get more than just a well-designed thin client solution. You also get all the advantages that come from doing business with HP, including the following:

- Complete server to client solution provider—"one-stop shop," from hardware to professional services
- Global availability, service, and support through our broad network of 50,000 IT professionals in more than100 countries

- HP quality and reliability
- Compatibility and use of industry standards

Figure 5. Server

Choosing a server

The sizing of the server is highly dependent on the computing requirements of the end users. As a general rule of thumb, a 2-way server would support 50 thin clients; a 4-way would support 100 clients, and so on. Heavier use would require more memory, storage, and processing power. As a world leader in servers, HP delivers the fast performance and reliability that are essential for thin client server environments. HP provides a wide choice of high-quality servers, allowing you to scale performance for any level of your business.

HP ProLiant server offerings include the following.

HP ProLiant ML servers

HP ProLiant ML servers are designed to provide maximum internal storage and I/O flexibility for rack or tower deployments. These workhorses can handle intensive applications ranging from enterprise resource planning (ERP) to e-commerce hosting. With up to eight processors, up to 11 PCI slots,
next-generation PCI hot plug, and redundant power and cooling, HP ProLiant ML servers are ideal for high-volume, 24 × 7 data center environments.

HP ProLiant DL servers

HP ProLiant DL servers deliver enterprise-class performance with robust, affordable multiprocessors in a slim (1U–7U) form factor that is ideal for multiserver rack environments. Optimized for clustering operations and attached external storage, HP ProLiant DL servers can handle jobs as large as data warehousing or as small as Web hosting.

HP ProLiant BL servers

HP offers two families of HP ProLiant BL server blades: e-Class and p-Class.

- e-Class. These ultra-dense server blades are optimized for rapid deployment and provisioning, and with up to 280 blades deployed in a single rack, they are ideal for space-constrained service providers. HP ProLiant e-Class server blades can handle a wide range of data center jobs, from front-end Web serving to other, more transaction-intensive applications. Their
  industry-standard design ensures that these server blades can integrate seamlessly into an existing IT infrastructure. Drag-and-drop configuration and rip-and-replace servicing position these server blades at the cutting edge of adaptive computing.

- p-Class. The more powerful HP ProLiant p-Class server blades deliver higher levels of performance and availability for high-performance front-end, mid-tier, and back-end applications.

Figure 6. Blade PC

Blade PC

As discussed earlier in this document, the Consolidated Client Infrastructure (CCI) solution from HP centralizes desktop compute and storage resources into easily managed, highly secure data centers, while giving end users the convenience and familiarity of a traditional desktop environment. CCI provides a dynamic workplace solution that may dramatically lower desktop total cost of ownership (TCO) and raise levels of security, service quality, and ease of management.

The HP blade PC works with thin clients as the second tier in a CCI installation. It has a 3U form factor that provides extreme density, thermal efficiencies designed to minimize power and cooling requirements, memory expandability to 1 GB for good performance while working in your mainstream applications, and dual 10/100 integrated network controllers that help maximize throughput efficiencies. The 40 GB hard drive provides ample storage for accessing and working with data.

Figure 7. HP monitors

Choosing a monitor

HP is a world leader in monitors, featuring award-winning CRT monitors and flat panel displays. Whatever the application, HP has the right display solution.

Monitor key features include:

- Price/performance. Optimum combination of price and performance for businesses that need value and reliability
- Compatibility. Thorough testing for reliability and compatibility
- Manageability. Plug and play ready, Asset Management support
- Ergonomic design. Anti-static/anti-glare glass, concealed cable management, tilt and swivel stands

For complete details, visit www.hp.com/products/monitors/.

HP Lifecycle Solutions

HP thin clients are supported under HP Lifecycle Solutions, delivering a broad selection of tools, information, and services that help users manage their PC lifecycle strategy. Along with
HP Lifecycle Solutions, users also get the benefit of a single point of accountability, and the flexibility to choose the program and level of support most appropriate to their environment. HP Lifecycle Solutions cover key areas, including:

- Planning. Including TCO assessment, availability review, network design, product selection, roadmap review, acquisition financing, proof-of-concept evaluation, and PC certification testing
- Deployment. Easier deployment with PC custom configuration, lease process integration, and hardware, software, and intranet installation and startup
- Management. Day-to-day tasks such as custom help desk management, financial asset tracking, change control and notification, and hardware maintenance and application support
- Transition. With lease-based reclamation and disposal, computer asset recovery, and lease-based technology refresh, we can help you take advantage of the latest PC technologies.

HP Care Pack Services

Protect your business from day one. HP stands behind its products with a three-year limited warranty. However, a warranty is meant to protect against hardware defects, not to safeguard your business. With HP Care Pack Services, you can easily select the right services to help limit downtime, which can sap productivity and may impact revenues in your business.

HP Care Pack Services[‡] are convenient service packages designed to give you just the level of service you want for HP products. Features include the following:

- HP expertise. HP provides fast response time and repair commitments with over 25,000 service personnel who have specific expertise with Microsoft, Unix®, Linux, and Cisco platforms, as well as storage, system management, security, and printing and imaging.
- Global and local service. HP serves customers in 160 countries, with over 25,000 service personnel in customer support and a total of 65,000 in HP Services, plus the industry's largest channel partner network. Selected regional packages are tuned to local needs.
- Full range of offerings. HP Care Pack Services support major hardware and software technologies, with maintenance services such as next-day exchange and accidental damage coverage for notebooks. Other services include:
  - Hardware support. Remote troubleshooting, escalation management, and customer choice of onsite support offerings, such as 4-hour response time with 24 × 7 availability and next-day response within standard business hours on selected HP hardware.
  - Installation services. Fast reliable turnaround coordinated with the delivery of HP equipment, site preparation and verification, installation of all HP hardware and selected third-party products, and installation and verification of included HP software.
  - Education services. Training in more than 200 product-specific courses delivered from over 120 HP and partner locations worldwide to 255,000 IT professionals each year.
- Deep partnerships. HP actively builds alliances with major solution providers, including Microsoft, SAP, Cisco, Oracle®, and dozens of other partners.

[‡] Services may vary by country and may not apply to all products.

- Knowledge management. HP actively captures, integrates, and distributes information to continuously improve the problem-solving process. The result of every interaction is fed into our worldwide knowledge base to become a repeatable solution, giving customers and service engineers access to high-quality and up-to-date information.
- Ease of use. HP Care Pack Services feature a simple ordering capability through online and physical channels. Support is offered across any piece of IT infrastructure you purchase from HP, from desktop to data center, including award-winning Web-based support and Instant Support Professional for remote support.

HP Access on Demand

Available in packaged and tailored versions, HP Access on Demand provides one-stop shopping for high-performance hardware and software platforms and a comprehensive array of lifecycle services. To help manage expenses and ease budget planning, HP Access on Demand is offered at a single, predictable price per seat, charged on a monthly basis for a three-year term. Instead of large up-front capital outlays for new systems, you manage one readily affordable monthly business expense covering the entire desktop infrastructure. With our new approach, you can simplify PC acquisitions and shorten implementation time, decrease training support and management costs, and tighten control of your entire desktop environment. Optimized for environments with 500 to 3,000[§] users, the packaged HP Access on Demand solution includes selected HP hardware as well as:

- Basic hardware installation and deinstallation. Unpacking, inspection, installation, connection to external devices, and user orientation are included, as well as system disconnection and packaging for shipment at the end of the three-year term.
- Hardware maintenance. Problem diagnosis, labor, and materials are included.
- Software support. Unlimited telephone support is available 24 × 7 for Microsoft software.
- Help center. You have a single point of contact within HP for logging requests for all covered services, 24 × 7.
- Program management. An experienced program manager functions as the single, central interface between you and HP.
- Inventory reporting. Standard desktop inventory reports include your monthly billing statements.
- Technology refresh. Upon renewal of the three-year service contract, HP-supplied hardware and software technology is replaced with state-of-the-art products and current software versions.

HP quality and reliability

HP prides itself on having a reputation for high-quality products—and HP thin clients are a testament to that reputation. Our quality and reliability help reduce maintenance, repair, and support costs throughout the thin client lifecycle and can result in a higher residual value for HP thin clients. Here's how HP builds quality into every HP thin client:

- Customer feedback. The evolution of HP thin clients is a direct result of extensive customer feedback, including focus groups, trade shows, customer visits, support calls, human factors studies, and surveys of thin client users.
- Testing. Numerous teams within HP ensure reliability and long life by testing every model in a variety of networked environments. We systematically push HP models past reasonable limits to make ensure that the toughest workplace conditions have minimal impact.
- Factory audits. Before leaving the factory, HP does a comprehensive examination on random samples to guard against defects and improve out of the box operation.

[§] Minimum and maximum requirements may vary based on local capabilities.

- Engineering excellence. HP quality does not stop at the factory door. Our service and engineering teams continue to support each unit throughout its lifecycle. The award-winning HP call center quickly resolves many issues on the first call.

HP compatibility/industry standards

Due to our longstanding industry partnerships with Intel®, Microsoft, and many other industry leaders, HP thin clients are engineered for maximum compatibility in most business applications. HP products are extensively tested for compatibility in environments simulating real-world conditions with leading hardware components. HP thin clients are Microsoft-certified to run the Microsoft Windows CE 5.0 and Microsoft Windows XP Embedded operating systems.

HP products are built around industry standards. HP serves as a major driver and participant in most of the industry's leading standards-setting organizations. This ensures HP products and technologies continue to provide solutions that maximize interoperability and upgradeability throughout every major technological revolution.

Conclusion

All the features of HP thin clients combine to make them the ideal business computing solution for customers with centralized computing needs, accounts seeking a total out-of-the-box solution, and IT managers who are looking for the most easily managed network. Designed to simplify IT management, HP thin clients are backed by the HP reputation for quality, reliability, and compatibility. For more product details and availability, check with your HP account manager or an authorized HP reseller.

Appendix: Sample scenarios

This section outlines sample TCSC scenarios.

Business application solution

Business case:

A school district may have 200 schools, each with a computer learning center where up to 50 students are using computers at any given time.

The solution:

- The school district deploys two HP ProLiant servers at district headquarters—one as a data store, the other to manage and deploy software applications to a server at each school.
- Each school uses a local server to give the HP thin clients fast, convenient access to applications. With no on-board storage, the thin clients offer protection from the students accidentally reconfiguring system files or deleting files, and students are unlikely to introduce viruses from external sources. The lack of moving parts gives the thin clients added reliability and no audible noises.

Business case:

A large bank has multiple branch locations, all using the same software applications to collect and process data on cash transactions.

The solution:

- An HP Compaq Thin Client is used at each teller's station to input information. With a diskless system, there is less risk of data theft or a virus attack. In addition, the lower power consumption of thin clients can reduce the bank's operating costs, plus noise levels are kept to a minimum since there are no moving parts. Should the bank want additional storage capabilities for their tellers, they can use an optional external MultiBay to add a hard drive or a CD-ROM drive.
- HP ProLiant application servers deliver maximum performance and availability for the most demanding business applications. The joint HP, Microsoft, and Citrix TCSC solution promotes centralized application management.

Citrix portal solution

Business case:

A global corporation has many remote offices and allows certain employees to work from home. However, conventional T1 or T3 network connections are expensive and not always available.

The solution:

- A portal solution offers easy, inexpensive access over the Internet. Employees in remote offices or those working from home receive secure access to the same server-based applications as workers in the office, and IT staff can manage all thin clients from a central location.
- Providing HP Compaq Thin Client t5700 devices for remote workers is a low-cost alternative when the full power of a desktop PC is not needed, but desktop-like features are required for extra processing power, faster refreshes, and users who want a broader range of capabilities than is usually available for thin clients.

Wireless solution

Business case:

The employees of a startup real estate business are moving into an old building to begin operations. The building has no network connections.

The solution:

- A combined wireless LAN** and TCSC solution offers a fast, easy way to establish a network and get employees working. Using wireless connectivity means no delays from removing old wiring or running new cables.
- An HP ProLiant server hosts all real estate and office applications.
- Thin clients are preconfigured and ready to go once connected to the wireless LAN.
- Employees can mix Web-based and Windows-based applications using the same secure browser.

** A standard WLAN infrastructure may be required for applicable wireless communication.

For more information

For more information about the HP thin clients or any other HP product, contact your HP Authorized Reseller or visit these online locations to learn more about HP products, services, and support:

- HP home page: www.hp.com/sbso/busproducts.html
- HP desktop or thin client information: www.hp.com/desktops
- HP workstations information: www.hp.com/workstations
- HP notebook information: www.hp.com/notebooks
- HP notebooks options information: www.hp.com/notebooks/options
- HP desktop options information: www.hp.com/desktops/options
- HP monitors: www.hp.com/products/monitors
- HP Tablet PC: www.hp.com/go/tabletpc
- HP iPAQ Pocket PCs: www.hp.com/go/ipaq
- HP security: www.hp.com/go/security
- HP Services: www.hp.com/go/services
- HP support: www.hp.com/go/support
- HP Care Pack: www.hp.com/hps/carepack
- Access on Demand: www.hp.com/go/aod
- "How to buy": www.hp.com/buy/howtobuy

To learn more, visit
www.hp.com/products/thinclients

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